ROYAL GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 9.] SEPTEMBER. [1887.

XVII.—ANNATTO.

(*Bixa Orellana*, L.)

In *Bulletin* No. 7, for July last, information was given as regards Annatto which appears to have drawn attention to its present position as an article of commerce. Amongst other communications, we have received from Messrs. Fulwood and Bland, Annatto manufacturers, of 31, Bevenden Street, Hoxton, the following notes, which will usefully supplement what has already been published on the subject :—

The great bulk of Flag Annatto comes from Cayenne and Guadaloupe in the form of a paste made into cakes of about 8 or 10 lbs., which are wrapped up in banana leaves and packed in casks weighing about 5 cwt.

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each. The best kind is that from Cayenne, but it varies very much in quality, so much so that its value at the present time ranges from 5*d.* to 1*s.* 8*d.* per lb.; it also fluctuates very much in price according to the seasons. The Guadaloupe Annatto is very inferior, being very sour, but bright in colour in consequence of the acid that the natives put into it; it is, however, of very little value for manufacturing purposes, and therefore never realises such a high price as Cayenne Annatto; moreover, it does not contain anything like the amount of colouring matter present in the Cayenne kind. Annatto seeds principally come from the West Indies and Ceylon. We have never heard of any being imported into this country from Cayenne or Guadaloupe, the best that we have seen have been from Jamaica; they vary very much indeed in quality in consequence of insufficient care in collecting, curing, and drying them before exportation. Large quantities came into the London market last year very much deteriorated in value in consequence of having been packed when damp and getting heated and mouldy, the colouring matter was seriously damaged, and a good deal arrived shrivelled up and broken into small particles (evidently gathered before quite ripe), which is very objectionable for manufacturing purposes. We bought seeds last year in London at 1½*d.*, 2*d.*, 2½*d.*, 3*d.*, 4*d.*, and 6*d.* per lb., and those at 6*d.* were much the cheapest for our purpose, since the labour and expense with bad seed is just the same as with the best quality.

The supply of seeds on the London market always has been very intermittent, so that we cannot rely upon a constant and regular supply every season, and last year we ordered two tons of some Kingston merchants which they could not supply. We are, therefore, decidedly of opinion that good, sound, hard, whole Annatto seed, properly collected and dried, free from mould, would meet with a ready sale in this country at such a price as would pay the growers well. If, however, they would only prepare the Annatto in the same way as they do in Cayenne, by washing the colouring matter off the freshly gathered seeds, and send it over here in cakes or in a semi-fluid form, it would be better. We are quite sure that it would pay them well to do so, as it would fetch a very much higher price than the Guadaloupe kind realises, and we should be securing an industry for our own Colonies that is now entirely in the hands of the French. This is the reason why nearly all the Flag Annatto is sent to France, to encourage their own shipping, and the French merchants make a good profit out of it before it reaches us. If, therefore, it answers the French Colonists' purpose to prepare the Flag Annatto and export it to France, surely it would pay the growers of Jamaica and Ceylon to do likewise and export it direct to us, they would then get a better price for it than the Cayenne growers do, because they would save the intermediate profits of the merchants in Cayenne and France. They ought to be able to prepare the Flag Annatto in Jamaica and Ceylon quite as well and as cheaply as the natives do in Cayenne; but it would not do for us to attempt it in this country from imported seed, because there is first the cost of freightage over here, and labour is too dear to attempt to compete with the natives of Cayenne in washing the colouring matter off the seeds. You will therefore, understand that we can buy the Flag or paste Annatto very much cheaper than it would be possible for us to prepare it ourselves in this country. Annatto seeds of best quality will consequently never fetch more than about 5*d.* or 6*d.* per lb. because of the competition with the Flag Annatto. Lisbon Roll Annatto is another kind that comes from Para, it is in a paste packed in baskets weighing about ¾ cwt. each. It is wrapped up in dried leaves, and is principally used

for colouring butter, being of no use whatever for colouring cheese; this also varies very considerably in quality. We bought it last year from 2*d.* to 1*s.* 9*d.* per lb. according to quality.

It has long been evident to us that sufficient care is not taken in washing the colouring matter off the seeds, and in preparing the Flag Annatto for the market we often find that it is very much adulterated with farinaceous and other substances to increase the bulk, which frequently causes a large amount of trouble to the manufacturer. We, in fact, seldom find two casks alike in quality or colour, and it is frequently kept until fermentation and decomposition set in, which of course destroy the colour; some that we had from the Polynesian Islands consisted simply of the colouring matter washed from the seed without admixture of any foreign substance. It was in a semi-fluid state and very pure, but a little dearer than Cayenne Annatto, and we cannot see any reason why the growers in Jamaica and Ceylon should not be able to teach the natives how to prepare it in this way, and we could then take large quantities of this kind of Annatto annually, and probably all that they could make. We would suggest that some of the growers should make the experiment and send us samples, and we would let them know how much we could give for it and the quantity we would take annually.

The consumption of Annatto throughout the world is of course limited. Our business has been established over 100 years, and for the last 50 years our importation of Annatto has not varied very much. Last year our imports of Annatto of the various kinds amounted to over 50,000 lbs., the great bulk of which was Cayenne Flag Annatto. Had we used the seeds only we should have required at least 200,000 lbs. for our business alone.

Annatto is principally used for colouring cheese and butter, for which purpose it has to be specially prepared so as to be perfectly pure and harmless when it reaches the consumer.

The following are among the many preparations of Annatto manufactured by us, specimens of which have been presented to the Kew Museum :—

Imperial Black Cake Annatto.
Treble Strength „ „
Extra Superfine „ „
Superfine Orange „ „
Fluid Extract of Annatto.
Butter Colouring.
Butter Colouring prepared in oil.
Roll Annatto, Spanish.
Cayenne Flag Annatto.
Lisbon Roll Annatto.

These are used for a variety of purposes, viz., for colouring jellies, hair, soap, candles, scent, spirits, confectionery, leather, pomades, chocolate, and in making lacquer for brass work, and dyeing calico, silk, wool, skin, rugs, straw-plait, feathers, wood, ivory, bone, &c., and also as an auxiliary in giving a deeper shade to the simple yellows.

Dyers also use the raw Flag Annatto very extensively for a reddish colour. It is not generally known that two colours can be obtained from Annatto, yellow and red.

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Since the receipt of the foregoing some extracts from the reports of American Consuls in various districts in South America on the subject of Annatto have appeared in the *Pharmaceutical Journal* for July 16th, 1887, p. 51. In Para, Consul Clayton states that it is the practice to allow the fruits to remain on the tree till wanted for use, the capsule does not readily burst, and the seeds remain for a long time in good condition. "With the most careless culture two full crops can be "gathered every year.

"The pigment is extensively used by the Indians in dyeing the "threads of hammocks, and by the wild Indians for painting their bodies, "they mixing with it turtle oil or the fat of the *peixe-bois* (manatee). "In Para it is sometimes used to give colour to cooked rice, but I have "never heard of its being so used on the Amazon. An infusion of the "leaves drunk hot is considered by the Indians a remedy for jaundice.

"The quantity of Annatto exported to the United States from this "consular district during the last two years amounted to 27,435 lbs. "and valued at 6,816 dollars."

From Barranquilla Consul Vifquain reports that "the natives use "the Annatto for colouring purposes. They are very fond of colouring "victuals for the table here. It adds nothing, however, to its quality. "The Indians use it as a defensive armour against the frisky and still "more pugnacious mosquito. They crush the seeds and anoint their "naked limbs with the stuff."

In Porto Rico Consul Conroy says that "the country working people "are fond of having planted near their little homesteads two or three "shrubs for the sake of the fruit, which they use as a condiment in "colouring and seasoning their messes of rice and other food in place "of saffron or red peppers.

"A very small quantity of Annatto is exported from this province "either to Spain or the United States, but no other preparation is given "to the article than merely drying the pods in a current of air under "shelter from the sun, and then packing them in bags or barrels."

XVIII.—NOTES on Articles contributed to the Museums of the Royal Gardens, Kew, from the Colonial and Indian Exhibition, 1886.

In no previous exhibition held in London, not even including the first Great Exhibition of 1851, were the vegetable products of the British Colonies and India so fully represented as they were at the Colonial and Indian Exhibition of 1886. In the London Exhibition of 1862, and in the Paris Exhibitions of 1867 and 1878, the timber resources of the countries represented were very fully shown. The collection of Colonial and foreign timbers now contained in Museum No. 3 of the Royal Gardens, most of which were procured from the exhibitions above referred to, will be sufficient proof of this ; many of these specimens are unique both in size and figuring when polished.

At the Colonial and Indian Exhibition last year, though woods were by no means omitted, other vegetable products, both raw and manufactured, were the most prominent. This was particularly the case in the collection of fruits from the different Colonies, and specially from the West Indian Islands.

The Kew Museums have always benefited largely from the several exhibitions, and, as might be expected, in no previous year have they been so extensively enriched as they were at the close of the exhibition last year; and this not only from the number of the specimens obtained, but also from the interest attached to many.

The following are some of the principal additions:—

CANADA.

The Canadian collection occupied a much larger portion of space than that given to any other individual possession. It was especially rich in timbers; but notwithstanding promises of assistance from the High Commissioner and other authorities at the exhibition, to help Kew to obtain what was required for the Museums, none of the timbers were available. The following were the only specimens received:—

Cranberries.—The fruits of *Oxycoccus macrocarpus*. American cranberries are imported into London and other parts of Europe in large quantities, as they bear the voyage without injury, and are generally preferred in this country to the native cranberry (*Oxycoccus palustris*), the berries of which are smaller, and not so bright a red as the American species.

Buffalo berries (*Shepherdia argentea*).—In the ripe fresh state they are of a bright orange colour, and are used for making tarts and preserves. The mealy pulp of the dried berries is also eaten.

From N.W. America several interesting articles of native manufacture, including a mask, a huge whistle, spoon, &c., made of the even grained wood of the **Native Cedar** (*Thuja gigantea*), were procured, also a native head-dress made of the bark. This bark is remarkable among the Coniferæ for its fibrous character, and is so strong that mats are made from it, and when twisted and plaited it forms a good basket making material.

NEW SOUTH WALES.

The Kew Museum being already in possession of a very fine set of woods and other vegetable products from this Colony, little or nothing was required or obtained for the collection, except a sample of **Pulu**, a soft woolly substance from the base of the leaf stalks of *Macrozamia spiralis*, a Cycadeous plant of New South Wales and Queensland. This substance is said to be produced in quantities, and used for stuffing mattresses, cushions, &c.

VICTORIA.

From the Victorian Commission were obtained a fine series of **Oils and Resins**, of several species of *Eucalyptus* the former being the special preparations of Mr. Joseph Bosisto, of Melbourne, President of the Commission in London, who has made a speciality of the preparation of Eucalyptus oils.

The following may be enumerated:—

Essential oil of *Eucalyptus amygdalina*, rectified and non-rectified. This species forms the highest of all known trees, one specimen having been found in Victoria measuring 470 feet high.

Essential oil of Eucalyptus of commerce. This is obtained from varieties of *E. amygdalina*, the leaves of which are not readily distinguishable by the bushmen who collect them These oils are very

powerful antiseptics, disinfectants, and deodorants, and are also used as rubefacients.

Essential oil of *Eucalyptus Globulus*, the Blue Gum tree of Victoria. It has tonic stimulant and antiseptic properties. It is stated that in Mr. Bosisto's factory in Western Gippsland 12,000 lbs. of Eucalyptus oil are annually produced, and as many as six tons of Eucalyptus leaves are manipulated daily.

Resin of *Eucalyptus rostrata*. The Red Gum of Victoria, described as a "thoroughly soluble and delicate mucilaginous astringent."

Resin of *Xanthorrhœa australis*, **Grass tree** of Australia. This resin is deposited on the trunks in large quantities at the bases of the fallen leaves. It is of a deep amber colour, and is used for staining woods, and in England for mixing with varnishes.

Resin of *Acacia decurrens* [*A. mollissima*]. This is of an astringent character, and is known as **Australian Catechu.**

Opium prepared from poppies (*Papaver somniferum*), grown in Victoria; it yields 10 per cent. Morphia.

WESTERN AUSTRALIA.

Timbers formed the principal exhibits from this Colony, the most remarkable of which was a log of **Jarrah** (*Eucalyptus marginata*). This log measures nearly 10 feet long by 4 feet 6 inches diameter, and contains 148 cubic feet. Its weight was nearly five tons.

A magnificent specimen of Curly Jarrah, which has dark, wavy transverse markings was also shown. It measures some 15 feet long, by about 2 feet 6 inches wide, and was cut and polished for a counter top. Both these specimens were very liberally presented to the museum of the Royal Gardens by the Western Australian Commission. Jarrah wood has attracted a considerable amount of attention of late years, as it has the reputation of being the most durable of all woods for moist or damp situations, as well as being equally lasting in dry positions. It bears, it is said, not only changes of temperature without injury, but it also resists the attacks of Teredo, White Ant, or any similar destructive agent.

The following woods were also presented to the Kew Museum by the Commissioners for this Colony.

Karri (*Eucalyptus diversicolor*).—A tree 80 to 100 feet high, the wood of which is of a deep reddish brown colour. Very hard and considered by some to be as durable as Jarrah.

Wandoo (*Eucalyptus redunca*).—A tree varying in size, but never growing to a great height. The wood is of a lightish red colour, very hard and durable, and is much used for cart shafts, spokes, cogs, rollers, naves, felloes, and railway waggon building.

Morrell (*Eucalyptus longicornis*).—Sir F. Von Mueller says this may probably be a variety of *E. oleosa*, from which it differs, however, in its comparatively tall stature, attaining a height of 120 feet or more. The wood is nearly as dark in colour as the Jarrah; it is extremely hard, and used for rafters, shafts, naves, spokes, harrows, and all kinds of wheelwrights' work. The leaves are said to be rich in oil.

Tuart (*Eucalyptus gomphocephala*).—A tree 40 to 50 feet high, the wood of which is strong and durable, and used for shafts, naves, and felloes of wheels, shipbuilding, railway waggons, &c.

York Gum (*Eucalyptus loxophleba*).—A tree seldom exceeding 80 feet high usually of very straight growth. Of the wood Sir F. Mueller

says, "it is regarded as the very best in West Australia for naves and "felloes on account of its toughness, though not sufficiently fissile to be "split into rails; it is for this very reason preferentially sought for "many superior purposes by artizans."

Raspberry Jam Wood (*Acacia acuminata*).—The produce of a tree 30 to 40 feet high, obtainable in considerable quantities. The wood is used for fencing posts, for which it is considered very durable; the dark colour and scented character of the wood however recommends it as a likely wood for cabinet work.

Sandalwood (*Fusanus spicatus*).—A tree 30 feet high, the wood of which is of a yellowish brown colour, close, even grained, and hard. It furnishes the bulk of the Australian Sandalwood, a very lucrative export trade in which has for years been done, principally with China. Three fine plants of *Kingia australis* in flower were also presented to the Museum. These singular plants belong to the natural order Juncaceæ, and the stems sometimes grow to a height of 20 feet.

FIJI ISLANDS.

A large and interesting collection of vegetable products were exhibited from these islands, a fine series of which were obtained for the Museum of the Royal gardens, of which the following is a selection.

Tamarinds, the fruits of *Tamarindus indica*, preserved in sugar. The tree is cultivated in all tropical countries, but it is from the West Indian islands and India that the European markets are principally supplied.

Candle Nut Oil (*Aleurites moluccana*).—This plant is widely distributed in tropical countries. The seeds contain a large quantity of oil, which is obtained by expression, and because of its drying properties is used for mixing with paints under the name of Country Walnut oil. The kernels when dried and stuck upon a stick are used as candles in the Polynesian islands.

Dilo Nut Oil (*Calophyllum inophyllum*).—A moderate sized tree of India, Ceylon, Andaman Islands, the Malay Archipelago, Australia, and Polynesia. From the seeds is expressed a thick, dark, strong scented oil, which is used both for medicine and for burning.

Copra, the dried kernel of the cocoa-nut (*Cocos nucifera*).—This is the most generally useful of all the palms, not only on account of its wide distribution, being found in the low-lying coast lands of most tropical countries, as India, Ceylon, Malay Archipelago, Straits Settlements, the Islands of the Pacific, West Indies, &c., but also for the numerous uses to which the fruits, fibre, &c. are put.

A considerable amount of attention has been given within the last 10 years to the cultivation of the cocoa-nut palm in the South Sea Islands, and a number of large plantations have been made.

The following notes are from the "Handbook to Fiji," issued in connexion with the Colonial and Indian Exhibition of last year:—"A "cocoa-nut has been known to flower in about four years, and others "at longer periods, but a fair crop of fruit need not be expected before "the tenth or twelfth year, after which the yield increases steadily "for five or six years more, when the maximum should be arrived at; "it then continues bearing heavy crops for 50 and even 60 years."

"Taking the produce of Fiji at 60 nuts per tree per year, an acre "would give, say, 4,200 nuts. This would make about two-thirds of a "ton of Copra, the average value of which is about 7*l.* 10*s.*, from "which deduct the expense of collecting and manufacture, which is

" about 2*l.* 10*s.*, which leaves a profit of 5*l.* per acre. It may be added " that Copra is shipped to Europe, where it sells at from 16*l.* to 20*l.* " per ton.

As regards the husk fibre, it is stated that the bulk of the fibre prepared in Fiji has hitherto found a market in Australia and New Zealand, but as the production increases it will be sent to other countries. "The husks from 7,000 cocoa-nuts produce about one ton " of fibre, which is of the value on the estate in Fiji of from 5*l.* to 15*l.* " per ton, according to quality. Brush fibre or bristles is worth from " 15*l.* to 30*l.* per ton, and yarn from 20*l.* to 30*l.* per ton in Fiji. The " cost of labour to produce one ton of fibre, exclusive of cost and wear " of machinery, may be put down at from 5*l.* to 10*l.*"

Besides the three principal articles of commerce obtained from the cocoa-nut palm, copra, cocoa-nut oil, and coir, the kernel of the nut is eaten in large quantities when young and fresh, and the hard, bony shell is made into drinking vessels, and other useful and ornamental articles. It is estimated in Fiji, where the cocoa-nut thrives so luxuriantly that it will, ere long, compete with sugar, tea, and coffee, as a source of great wealth to the colony.

Kava root (*Piper methysticum*).—The finest masses of this root shown at the Exhibition were afterwards obtained for the Museum collection, together with a sample of the ground root. Kava root is the source from whence the Fijian beverage called Kava is made, in former times by masticating the root, ejecting the saliva into bowls and fermenting it. The root is known to have diuretic properties, and has attracted some attention in this country of late for its medicinal value. During the period of the Exhibition a spirit was prepared from Kava root under the name of yagona, Kava schnapps, or aromatic gin, and sold at the refreshment bars. It was described as "having been the Royal drink of the Fijian and Samoan Chiefs from time immemorial."

Bandina Boxwood.—The botanical source of this wood cannot be traced, nothing but specimens of the wood itself, prepared in square blocks and smoothed ready for engraving purposes, having been received. The wood is of a very dark reddish brown colour, close and even-grained, and apparently very dense, and from outward appearances it would seem to be a good substitute for boxwood. Upon submitting a sample to Mr. Robson J. Scott, the well-known boxwood block manufacturer, of 8, Whitefriars Street, E.C., for his opinion, I was favoured with the following, dated 17th June 1886:—"I think your " Fiji wood has no special claim for engraving purposes, its colour is " bad and reduces its value. It would be only fit for common work, " for which nature supplies us with a sufficient quantity of inferior " box." In a further communication, dated 21st June 1886, Mr. Scott says:—"Another word upon this wood. Cutting upon wood is " like drawing upon paper, if it is tinted there must be a limit to the " density of the tint, or your drawing will be absorbed by the tint upon " which it is drawn. An engraver would have difficulty in observing " his progress while doing his work."

Notwithstanding this unfavourable report as to its use for engraving purposes, the wood might become useful where a very hard, dense, and high coloured wood is desirable. It is said that if a demand should arise for it a large supply could be had from Fiji and the other outlying groups of islands in the Pacific, and the wood could be had of a size up to two feet in diameter.

The collection of Fijian timbers presented to Kew have been arranged in Museum No. 3, and a description of them will be incorporated in the next edition of the Guide to that Museum.

CAPE OF GOOD HOPE.

A large and varied collection of vegetable products were obtained for the Museum from this Commission, including some fifty-five specimens of drugs and forty specimens of woods. Amongst the former the following may be enumerated :—

Groot Bells (*Osmitopsis asteriscoides*).—The plant is found along the banks of streams. It has a strong aromatic odour and taste, and is used in the form of an infusion in coughs, hoarseness, and chest diseases generally, as well as in flatulence. The plant abounds in an essential oil, which is said to have a peculiar affinity to cajeput oil.

Bok Buchu (*Agathosma virgata*). — The plant grows on the mountain slopes, and is used for pulmonary complaints.

Wild Celery (*Bubon Galbanum*).—It is found all over the Colony in moist situations or in ravines of mountains, and has an acknowledged reputation amongst the people as a diuretic. A decoction of the leaves is used in dropsy and gravel.

Wild Dagga (*Leonotis Leonurus*).—It grows wild in the Sandy Cape flats, and often on the roadsides, but is often grown in gardens on account of its beautiful flowers. It has a peculiar scent and a nauseous taste, and produces narcotic effects if incautiously used. In the form of decoction it is employed in chronic cutaneous eruptions. "The "Hottentots are particularly fond of this plant, and smoke it instead "of tobacco, and take a decoction of its leaves as a strong purgative. "The Kafir name of the plant Umfinca-fin-cane is taken from the "sugar birds sipping the sweets from the bottom of its long trumpet-"shaped corolla. Before the mouth of its corolla opens, which it does "when the stamens are mature, the nectar is intensely bitter, but at the "moment of opening the sweetness is developed."

Sour Figs (*Mesembryanthemum edule*).—"Few South African "plants are so much in domestic use as this species and *Mesembryan-*"*themum acinaciforme*, both of which are common in the sandy tracts "of the Colony. They are astringent and sourish in taste on account of "the acidulated alkaline salt with which they seem to be impregnated. "The expressed juice of the succulent leaves taken internally checks "dysentery and acts as a mild diuretic, while it is also, for its antiseptic "property, used as an excellent gargle in malignant sore throat, violent "salivation and aphthæ, or in the form of a lotion in burns and scalds. "At the Cape these plants are called Hottentots vijgen or Hottentots "figs. The fruit is eatable and used for preserves."

Xaibosch (*Helichrysum serpyllifolium*).—A composite plant growing near the watercourses on the Cape mountains ; it has a pleasant smell, and is much liked by the coloured people, who use it as tea, hence it is known as Hottentots tea. It possesses demulcent and emollient properties, and is used in catarrh as well as in diseases of the chest.

Wilde Als or **Wormwood** (*Artemisia Afra*).—"The whole plant has "a strong balmy smell, and a bitter, aromatic, but nauseous taste owing "to a green essential oil which it contains. The herb is tonic, anti-"spasmodic and anthelmentic, and very useful in debility of the "stomach, visceral obstructions, jaundice, hypochondriasis, or similar "evils, while its efficacy as a vermifuge is generally admitted. The "best forms for using it are the infusion, the decoction, and tincture,

" the latter being preferred by the colonists. A strong infusion is used " externally as a collyrium in weakness of the eyes, and the pounded " leaves and stalk are employed as a discutient in œdema and suggil- " lations."

The following are some of the most important Cape woods received :—

Stinkwood or **Laurel Wood** (*Ocotea* [*Oreodaphne*] *bullata*).—A tree 50 to 60 feet high, and a diameter of from 4 to 5 feet. The tree rarely grows upright from the fact, it is alleged, "that most of the " trees are produced from coppice shoots. The stinkwood seedling is " endowed with a hardy constitution, but when it reaches the ligneous " state it requires plenty of air, and to participate freely in the various " atmospheric influences—light, dew, rain, &c. It cannot stand dense " shade for any length of time. It is reproduced by a process of natural " coppicing, which is extremely curious. The trunk of an old tree dies " from the top downwards, and then from the base is produced a sheaf " of young shoots round the old dead trunk. These dead logs remain " standing a long time before decaying, and frequently yield good, " sound timber. If the old trunk be not removed and suffered to decay, " the young shoots put out roots which run down the parent trunk, " eventually reaching the ground, where they take root. Young trees " in this manner are very liable to become windfalls."

Three varieties of stinkwood are known at the Cape, white, mottled, and nearly black; these are said to be due probably to varying conditions of growth rather than to any botanical differences.

From the specimens exhibited in the Museum it will be seen that the wood is not unlike walnut, and that it takes an excellent polish. Mr. Ransome in his Report on Colonial Timbers says, "the wood proved " easy to work in all cases, and left the cutters with a good finish."

Yellow Wood or **Upright Yellow Wood** (*Podocarpus latifolius*).—The tree grows under favourable circumstances to a height of 75 feet, with a diameter of 2 feet, and forms a remarkably straight trunk. It grows readily from seed, and small trees are abundant in the forest. The tree is felled in the Amatolas during the months of May, June, and July, and then left to season for a year in a place sheltered from sun, rain, and hot winds. Unless cut in the proper season and carefully dried, it warps and splits badly.

The wood is of a light yellow colour, fine and close grained, and according to Mr. Ransome's report proved very easy to work. "It was " passed through the vertical frame, and was found to saw very clean " with a rapid feed. It was passed through the planing and moulding " machines with a feed of 40 feet a minute, leaving a fine and very " smooth surface." For bedroom furniture the wood is excellent, and was much admired at the Exhibition. The tree is abundant in the forests of George, Knysna, and Amatola.

Outeniqua Yellow Wood (*Podocarpus elongatus*).—This is a much larger tree than the preceding species, attaining indeed a larger size than any other tree in the Colony. Notwithstanding that this wood has been used in very large quantities in the Colony for beams, planks, flooring boards, and similar purposes, "there still remains gigantic " specimens of these beautiful and stately trees in the forests of Knysna " and Alexandria, on the coast, and in the Amatola mountains. Bush " cutters have preferred to fell the smaller and more easily handled " timber rather than encounter the labour and difficulty of sawing and " shipping these monsters. . . . One of the largest trees measured " at Knysna is 23 feet in circumference and 80 feet in height. In the

" Amatolas trees of this size are more common. The largest tree " measured there has a girth of 34 feet, and is 90 feet high."

The wood, when well selected and properly seasoned, should be of a light yellow colour and a straight even grain. The slab presented to the Kew Museum, measuring 20 feet long and 5 feet in diameter, shows a dark centre and some cracks, indicating that proper care was not taken in its seasoning.

Black Iron Wood (*Olea laurifolia*).—An erect tree, 40 to 70 feet high and 2 to 3 feet in diameter, abundant in the Knysna forests and in the Amatolas. The sapwood is white, while the heartwood is of a dark brown with black wavy markings, similar to, but much darker than common olive wood. "Decay frequently begins between the heartwood " and sapwood, and gradually extends outward until nothing but the " heartwood remains," which is well nigh imperishable and is said to equal lignum vitæ in durability. The wood makes excellent furniture, but owing to its hardness it is difficult to work. It is much used for the framework of waggons.

Amongst other Cape woods presented to the Museum which appear to be worth the attention of the cabinet-maker are the following:—

Cape Ash (*Ekebergia capensis*).—Tree 40 to 50 feet high; 2 to 3 feet diam.

White Iron Wood (*Toddalia* [*Vepris*] *lanceolata*).—Tree averaging 20 feet, but sometimes 60 feet high; 1 to 4 feet diam.

Saffron Wood (*Elæodendron croceum*).—Tree 20 to 40 or even 60 feet high, and 2 to 4 feet diam.

The bark is used for tanning and dyeing.

White Pear (*Pterocelastrus rostratus*).—Tree 20 to 30 or sometimes 70 feet high; 1 to 2 feet diam.

Cape Beech or Benkenwood (*Myrsine melanophlœos*).—Tree 20 to 25 feet high; 12 to 18 inches diam.

Red Els or Red Cedar (*Cunonia capensis*).—Tree 15 to 25 or even 60 feet high; 2 to 3 feet diam.

White Alder (*Platylophus trifoliatus*).—Tree 30 to 40 feet high; 2 to 4 feet diam.

Red Pear (*Scolopia* [*Phoberos*] *Ecklonii*).—Tree 30 to 35 feet high; 2 to 3 feet diam.

Quar (*Euclea undulata*).—Tree 20 to 30 feet high; 12 to 15 inches diam.

Vlier (*Nuxia floribunda*).—Tree 20 to 25 feet high; 15 to 20 inches diam.

Red Wood or Cape Plane (*Ochna arborea*).—Tree 20 to 40 feet high; 12 to 18 inches diam.

Knobwood (*Xanthoxylon capense*).—Tree averaging 15 to 20 feet, but sometimes attaining 50 to 60 feet high; 1 to 2 feet diam.

Wild Chestnut (*Calodendron capense*).—Tree 60 to 70 feet high; 4 to 5 feet diam.

Keurboom (*Virgilia capensis*).—Tree 20 to 25 feet high; 12 to 18 inches diam.

The most remarkable, perhaps, of all the Cape woods is the **Umzumbit** or **Umtiza** (*Millettia caffra*). " A small but common tree of " the East London and Transkeian Coast forests. Attains a height of " 30 to 35 feet, and a diameter of 1½ to 2 feet. Umzumbit is remarkable " for its deeply fluted stem, and very hard, well defined heartwood. The " most valuable Kafir walking sticks are made from this wood by " splitting a billet out of the centre of the tree, and then paring away all " but the knob to the thickness required. Clubs and amulets are also

" made from the wood in the Transkei. Owing to the small size of the " tree, and its curious habit of growth, it can only be used for small work ; " but the rich colouring of the strongly marked heartwood has a hand- " some appearance against the hard but light coloured sapwood. . . . " Umzumbit will probably be a valuable tree if the Transkeian forests are " systematically worked. It is believed to be the hardest and heaviest " wood in South Africa."

Reporting on this wood Mr. Ransome says :—" Being very hard, of a " somewhat greasy nature, and free from resin, Umzumbit is con- " sidered an excellent wood for bearings, the result of some experiments " with the diamond polishing machines at the Colonial and Indian " Exhibition showing that it will last nearly seven times as long as " Lignum vitæ."

NATAL.

The specimens obtained from this Colony were of a varied character, and interesting as showing the progress made since the International Exhibition of 1862, especially in the case of tea and maize. Some samples of tea of very good quality were obtained for the Museum; and it is interesting to know that the China tea exhibited by Mr. Brickhill was procured from plants introduced from the Royal Gardens, Kew, 20 years ago.

In connexion with the tea industry in Natal the following extract from the Natal Official Handbook will be found useful :—" Tea is now " looked upon as one of the most promising industries of the coast. " A few plants were introduced in the early days of the Colony from " Kew, and seemed to do well. About 1863 some attention was given " to the subject, but from want of skill in management, the samples " produced did not find favour, and it was thought that the variety of " the plant was one which would not produce a good marketable article. " It was not till the apparent failure of the coffee tree showed that " something was wanted to take its place on small plantations that " efforts were made for the importation of fresh seed. This was " obtained through Calcutta in 1877, and the varieties imported were " Assam hybrid and Assam indigenous. Since then the tea enterprise " has made steady progress, and seems eminently adapted for small and " well-managed estates on the coast belt, and may possibly yet be found " profitable further up country. The experience gained, not without " cost and difficulty by the pioneers, is available for the benefit of the " Colony. The climate evidently favours the plant. The yield is " large, there is plenty of very suitable soil, and labour is not more " costly than in many tea countries. Though struggling against " local prejudice and custom, which still cling to China teas of intrin- " sically inferior quality, there are hopes that Natal tea may become an " important article of export as well as of local consumption. It " possesses fine flavour and strength, and promises to make its way on " its own merits in the London market. There are now 12 growers, " mostly in the Tugela division of Victoria county, and the total " acreage at present under tea is about 400 acres." About 200 additional acres were prepared during the past year. The yield per acre has been very large, amounting in three years to 200 lbs. of dry tea; in four, to 400 lbs.; in five, to 600 lbs.; and in six to 800 lbs. Tea was exported from Natal in 1883 to the value of 1,499*l*.

Maize (*Zea Mays*).—This is described as by far the most important grain crop of the Colony, thriving everywhere, from the mountain tops

to the sea. It is the universal food of the natives, and furnishes the settler with a very large proportion of his every day fare. It grows well under the rudest preparation of the soil, and yet repays abundantly the outlay spent in thorough and careful cultivation. The grain is generally known under the name of mealies; about three million bushels being the quantity produced in the Colony in 1884. Last year's (1886) crop was so large that it was estimated that it would be considerably in excess of the home demand, and a channel for export would have to be sought.

Amongst tanning substances, of which many were exhibited, those of the greatest interest and the least known were the bark and root of **Intolwana** or **Elands Bontjes** (*Elephantorrhiza Burchellii*), which has attracted some attention of late in consequence of the high per-centage of tannin it is said to contain, and the Umgwenga bark (*Harpephyllum Caffrum*). The tree is known at the Cape as the Kaffir Plum, and the wood is useful for cabinet-work.

The following are amongst other specimens of less interest received from Natal:—

Ground Nut oil cake from *Arachio hypogæa*. **Wild tea,** from *Geranium incanum*. Concrete and crystallised **Sugar,** from the sugar-cane (*Saccharum officinarum*). **Linseed** (*Linum usitatissimum*). Extract of **American Aloe** (*Agave americana*), used in medicine. **Tobacco,** in leaf and cut. **Fenugreek,** the seeds of (*Trigonella Fœnum Græcum*), &c. &c.

CEYLON.

The exhibits from Ceylon were very numerous and very varied; specially prominent were the collections of woods and drugs. Neither of these, however, were available for the Museum of the Royal Gardens; nevertheless, a large number of specimens, including foods, drugs, oils, &c., were presented by the Commission, of which the following are some of the most important:—

Cardamoms, the fruits of *Elettaria Cardamomum*.—A perennial herb, native of Southern India, and growing abundantly in rich humid elevated forests in North Canara, Coorg, and Wynaad. The fruits are gathered and dried, and then form the Cardamoms of commerce, which are valued for their agreeable aromatic character, and their carminative and stimulant properties. Besides being used in medicine, they enter into the composition of curry powder.

Cinnamon (*Cinnamomum zeylanicum*).—Some fine bundles of this important and well known spice were exhibited. These bundles were remarkable for the smallness of the quills of which they were composed, as well as for their pale even colour and delicate flavour. One bundle was obtained for the Museum.

Vanilla.—The pod-like fruits of *Vanilla planifolia*, a climbing Orchidaceous plant, native of Mexico, where also now it is extensively cultivated, as well as in Mauritius, Bourbon, Madagascar, and Java. The pods after gathering are carefully dried by alternate exposure to the sun and air, and wrapping in woollen cloths sometimes steeped in oil. The vanilla of commerce is obtained from Mexico, Bourbon, Mauritius, Java, Honduras, Brazil, &c.

Areca Nuts (*Areca Catechu* var. *alba*).—These are the seeds of a graceful palm found throughout Peninsular India, Ceylon, South China, the Phillipines, and the islands of the Malay Archipelago. The Areca, or Betel Nut as it is mostly called, is usually about the size of

a nutmeg, but more spherical and flattened or depressed; they are marked throughout their substance with a brown rumination; they are astringent, and are largely used in the East as a masticatory. The actual specimens here referred to are of unusual size.

The following samples of Ceylon **Tea** were obtained for the Museum:—Flowery Pekoe, Pekoe, Broken Pekoe, and Pekoe Souchong. The tea industry in Ceylon has marvellously increased during the past 10 years. In 1876 only 282 lbs. were exported, while in 1885 the exportation had reached 3,796,684 lbs.

Cinchona barks were fully illustrated at the Exhibition, and the Museum of the Royal Gardens became enriched by specimens, each six feet long, of the following species:—*Cinchona succirubra*, renewed quill; *C. Ledgeriana*, original quill; *C. officinalis*, renewed quill.

A collection of 37 specimens of fruits, seeds, and drugs, new to the Museum, were also obtained from the Ceylon Commission.

MAURITIUS.

Besides the entire collections of fibres and woods exhibited in this court, several of which are of especial interest, the Museum received samples of remarkably fine **Vanilla** pods covered with crystals of vanilline, and of **Job's tears**, the seeds of *Coix Lachryma*, a common tropical grass, the seeds of which are much used for necklaces and other ornamental purposes.

STRAITS SETTLEMENTS.

The collection of vegetable products presented to the Kew Museums by the Commissioners for the Straits Settlements amounted to some 115 specimens, and included woods, barks, fruits, seeds, &c.

The following are among the most important or interesting:—

Grogoh, or trap used for catching river fish, made of a single stem of Bamboo by splitting, opening it out, and plaiting.

Damar holder, used as a candlestick. This is an instrument for holding a kind of torch made of resin of a species of *Shorea*.

Betel Nut Fibre (*Areca Catechu*).—This is the fibrous husk of the fruit exhibited as a paper material. As a waste product it is said to be produced in almost unlimited quantities. Considering the very general practice of Betel chewing in the East, and the abundance of fruits produced, the adaptation of this apparently useless material for paper making would seem to be a very probable benefit to the countries where the *Areca Catechu* is common.

Fine samples of the following edible fruits preserved either in syrup or spirit were also obtained:—

Dookoos (*Lansium domesticum*), **Rambutan** (*Nephelium lappaceum*), **Kepayang** (*Hodgsonia heteroclita*), **Buah Brangan** (*Castanopsis sp.*), *Peirardia sapida*, *Rhodomyrtus tomentosa*, **Papaw** (*Carica Papaya*), *Zalacca edulis*.

BRITISH NORTH BORNEO.

By far the most important of the vegetable products exhibited by this Commission, and which were at the close of the Exhibition presented to the Kew Museum, were the woods. Some very fine planks of the principal timbers attracted a good deal of attention during the period of

the Exhibition, and now form a feature in the timber collections at Kew. Many of these woods unfortunately had no scientific names, such, for instance, as the—

Billian or **Borneo Iron Wood.**—It is very hard and heavy, exceedingly strong and tough, "proving," Mr. Ransome says in his report, "more "than 50 per cent. stronger than English oak in resisting a breaking "strain. . . . It is proof against the teredo and white ant, and "is consequently in great demand for wharf piles and planks in the "Straits Settlements and China. This wood should be largely imported "into England, as it could be sold at the London Docks with a good "profit at 3*s.* 6*d.* a cubic foot, and might take the place of green-"heart and teak for many of the purposes for which those woods are "now employed."

Sumatra or **Borneo Camphor Wood** (*Dryobalanops aromatica*).—This wood is remarkable as being the source of the well known Sumatra Camphor, which is found crystallised, often in large masses, in interstices of the wood. It is not so volatile as ordinary camphor, and is harder and more brittle. The Chinese use it in preference to the camphor of commerce, which is a product of their own country. The wood is of a dark brown colour, hard, and heavy.

Mirabou (*Afzelia palembanica*).—This is a strong and durable wood, with a dark brownish figure. It somewhat resembles teak in grain, and is well adapted for furniture and cabinet work, as it works well and takes a good polish.

The other woods received at Kew are—

Penagah, White Borneo Cedar, Greeting, and **Russock.** All of them are woods of more or less value. Besides these, various samples of **Gutta-percha,** and some remarkably fine specimens of Dipterocarpeous **Resins,** were presented to Kew by the British North Borneo Company.

BRITISH GUIANA.

The most striking exhibits obtained from this Colony were the two magnificent squared trunks, most liberally purchased and presented to the Royal Gardens by Everard im Thurn, Esq., Stipendiary Magistrate, Pomeroon river, of **Greenheart** (*Nectandra Rodiæi*), and **Mora** (*Dimorphandra* [*Mora*] *excelsa*). The first is one of the tallest of forest trees of British Guiana, logs being obtainable from 18 to 24 inches square and 70 feet long. Greenheart is one of the most durable woods known. It is used for keels and other timbers of vessels, house framing, mill timbers, wharves, &c., and the bark is the source of the well known alkaloid *Beeberine*, used as a tonic and febrifuge. The Mora is also a very large tree, growing to a height of 200 feet and squaring 24 inches. The wood is extremely strong and durable, and is used for ship and house building, furniture, &c. The bark is astringent, and used in medicine and tanning. The two specimens here alluded to it will be remembered stood at the entrance to the British Guiana Court of the Colonial and Indian Exhibition, and measured some 28 feet in length.

Besides these two logs, the Museum is also indebted to Messrs. Park and Cunningham, of Georgetown, Demerara, for a set of 25 selected specimens of native woods. The other products obtained from this Court included **Dried Bananas** and **Plantains. Ochro** seeds (*Hibiscus esculentus*). Preserved **Tamarinds** (*Tamarindus indica*). Dried **Sorrel flowers** (*Hibiscus Sabdariffa* Seeds of *Ormosia dasycarpa.* **Rubber**

from *Hevea spruceana*. Dried **Sweet Cassava** in slices (*Manihot Aipi*). Ball and Sheet of prepared **Balata** from *Mimusops globosa*. Fruits of **Tonquin Bean** (*Dipteryx odorata*). Bark of *Simaruba amara*. Fibre of the Monkey Pot tree (*Lecythis ollaria*). Fibre of Arassee (*Corchorus siliquosus*), &c. &c.

JAMAICA.

From this Colony a collection of over 100 specimens were obtained, consisting of fruits preserved in fluid, seeds, barks, oils, &c. The following notes refer to a few of the most important.

Ylang Ylang, the fruits of *Artabotrys odoratissma*.—From the flowers of this plant the well known perfume known as Ylang Ylang is obtained.

Star Apple (*Chrysophyllum Cainito*).—The fruits are edible and a spirit is also distilled from them.

Jimbling (*Phyllanthus distichus*).—The fruits are acid and are used for pickling.

Arracacha, Tubers of *Arracacia esculenta* cultivated and eaten as a vegetable.

Carambola (*Averrhoa carambola*).—An acid edible fruit; used also for pickling.

Coco Plum (*Chrysobalanus Icaco*).—The fruits, which are about the size of an ordinary plum, have a sweetish taste, and are eaten either raw or made into preserve.

Bottle Cod root (*Capparis cynophallophora*).—Adrue roots (*Cyperus articulatus*). Pomegranate root bark (*Punica granatum*). Soap berries (*Sapindus inæqualis*). Guaco roots (*Mikania guaco*). Bastard cabbage bark (*Andira inermis*). Locust tree bark (*Hymenæa courbaril*). Roots of False Ipecacuanha (*Asclepias curassavica*). Balsam tree bark (*Amyris balsamifera*). Maiden Plum bark (*Comocladia integrifolia*). Also a collection of essential oils prepared from the following plants:—*Hedyosmum nutans, Eucalyptus Globulus, Critonea-dalca, Andropogon citratus, Juniperus bermudiana, Micromeria obovata, Pimenta officinalis, Moringa pterygosperma, Cocos nucifera, Aleurites molucana, Hura crepitans, Calophyllum calaba, Fevillea cordifolia, Citrus Bigaradia.*

TRINIDAD.

From this island came a collection of 35 specimens of native woods in planks, averaging in size 3 feet by 18 inches. These are for the most part well selected and prepared specimens, and have been arranged in Museum No. 3.

GRENADA.

A remarkably fine collection of fruits of this island, preserved in brine, were exhibited by Colonel Duncan. The whole of the collection was presented to the Kew Museum at the close of the exhibition; and comprised, amongst others, the following:—**Bread Fruit** (*Artocarpus incisa*). **Jack Fruit** (*A. integrifolia*). **Papaw** (*Carica Papaya*). **Sweet Potatoes** (*Ipomæa Batatas*). **Custard Apples** (*Anona reticulata*). **Kola Fruits** (*Cola acuminata*). **Cloves** (*Eugenia caryophyllata*). **Sand Box fruits** (*Hura crepitans*). **Pois doux** (*Inga-laurina*). **Nutmeg**

Fruits (*Myristica fragrans*). Gru Gru (*Acrocomia sclerocarpa*). *Lucuma mammosa*, *Achras Sapota*, &c. Many of these fruits were of exceptionally fine growth, and extremely well preserved.

DOMINICA.

Dr. H. A. Alford Nicholls, F.L.S., who was a very large exhibitor from this island, and who is a valued correspondent of the Royal Gardens, the Museum being indebted to him for many previous contributions, kindly placed the whole of his collection at the disposal of Kew. A large number of interesting specimens were thus secured, including the following:—**Guava** bark (*Psidium Guaiava*). Very fine pods of *Acacia Farnesiana*. Husks from seeds of **Liberian Coffee**; these are said to be worth from 1 to 2 cents per pound in the United States, where they are roasted and ground. **Angelin** bark (*Andira inermis*). Fine pods of **Purging Cassia** (*Cassia Fistula*). Hat stand made of **Swizzle stick** wood (*Myrodia turbinata*). **Carib ginger**, and a collection of Dominica woods.

From Bahamas, St. Lucia, Antigua, and Montserrat, specimens in smaller numbers were procured.

BRITISH HONDURAS.

In this court the Belize Estates and Produce Company were large exhibitors of vegetable produce, and through the courtesy of the secretary many valuable additions were made to the Museums, notably the following woods:—**Star Apple** (*Chrysophyllum Cainito*), **Madu Cacao** (*Erythrina umbrosa*), **Ironwood** (*Laplacea hæmatoxylon*), **India Rubber** (*Castilloa elastica*); a remarkable twisted specimen of **Logwood** (*Hæmatoxylon campechianum*), and a fine buttressed base of a **Mahogany** trunk (*Swietenia Mahagoni*).

WEST AFRICAN SETTLEMENTS.

The collections from Sierra Leone, Gambia, Gold Coast, and Lagos were of a very varied character, including a large number of raw vegetable products. Comparatively few, however, were absolutely new to the Kew Museum, and a large number were badly prepared or without names. Some very large balls of **rubber** were obtained from Sierra Leone, Gambia, and Gold Coast; also samples of **Indigo** in course of preparation from *Lonchocarpus cyanescens*, — **Laintlaintain Seeds** (*Lophira alata*) the oil of which is expressed and used both for cooking and for the hair. Seeds of *Hyptis spicigera*, an oil seed from Sierra Leone. A yoke for carrying loads made of the petiole of *Raphia vinifera*, and many other specimens.

CYPRUS.

The exhibits from this recent addition to the British possessions were not numerous. Vegetable products were poorly represented. The following are amongst the specimens obtained for the Museums:—Black

Honey prepared from **Carob** beans (*Ceratonia Siliqua*). These beans contain a large quantity of sweet pulp, and are used in Southern Europe for feeding horses, mules, pigs, &c., and even for human food in times of scarcity. Quantities of the beans are now imported into this country, and form one of the ingredients in the concentrated cattle foods. **Trimithia Seeds** and Gum (*Pistacia Terebinthus*), Wood and Cones of *Alnus orientalis*. Fruits of *Arbutus Andrachne*, &c.

INDIA.

The enormous collection of vegetable products shown in this court made the selection for the Kew Museum one of some difficulty, nevertheless a very large series was procured and removed to Kew. The following are only a few examples showing the nature of the exhibits.

Among the more important specimens of timber acquired for the Museum may be mentioned a fine slab of **Padouk** or Andaman Redwood (*Pterocarpus indicus*), a lofty tree of Burma and the Andaman Islands. The wood is fairly hard, of a deep red colour, which darkens or becomes brown on exposure to the light; it seasons well, and takes a good polish, for which reasons it is much used for furniture as well as for cabinet work, &c.

Andaman Marble Wood (*Diospyros Kurzii*) is produced by an evergreen tree, native of the Andaman Islands, as its common name indicates. This wood was an interesting feature in the Indian Economic Court on account of the peculiar marking of one slab, which resembled as nearly as possible what might be effected by the casual upsetting of an ink bottle, an appearance not to be found in any other wood. The wood is very hard, and is usually irregularly blotched with black markings upon a greyish ground, arranged in alternate streaks of grey and black; it is used in cabinet work, and should be better known to English hardwood dealers. The Andamanese employ it for handles and sheaths of blades, and for furniture.

A dug-out or canoe formed from the hollowed out stem of the **Tál or Palmyra Tree** (*Borassus flabelliformis*), was secured for and has been placed in the No. 2 Museum. The Hindoos also use the hollowed out stems of this palm for water pipes; and split in half for gutters and open water channels.

The highly interesting and instructive model of an **Indigo factory**, which has now been placed in a special case in Museum No. 3, was an object of particular attention during the Exhibition; it shows the manufacture of indigo through all the various processes, from the bringing in or harvesting of the crop to the finished manufactured product.

Another model showing the **collection of Toddy**, from the Indian Date Palm (*Phœnix sylvestris*), and its subsequent conversion into sugar, has been placed in the No. 2 Museum. The collector of the toddy is represented in the crown of leaves, drawing the juice from the freshly cut spathe.

A very large collection of fibres was sent from India to the Exhibition, and from these a typical set was selected for Kew. Among the more important of them may be mentioned the following :—

Jute (*Corchorus capsularis, and C. olitorius*). The former species yields the Jute fibre of Central and East Bengal, while the latter is that

cultivated in the vicinity of Calcutta. Jute is an article of large and increasing importation to Great Britain, being chiefly used in the manufacture of carpets and other fabrics. The people of India use a large quantity of this fibre annually for agricultural and internal trade purposes, added to which an immense number of gunny bags leave India filled with sugar, wheat, rice, and other grains.

Sunn Hemp (*Crotalaria juncea*). This plant is extensively cultivated in India for its fibre, which by careful preparation becomes soft, fine, and white, bearing comparison with flax. The waste is utilised in the manufactnre of paper.

Deccani Hemp (*Hibiscus cannabinus*). A small shrub with prickly stems, generally cultivated in India; apparently wild east of the Northern Ghauts. The fibre produced from this plant is considered stronger, though not so good as the Sunn Hemp. In India it is used for nets and ropes, and in the Dacca district, Bengal, it is the chief fibre used in the manufacture of paper. It is also stated to be sometimes met with as an adulterant of jute.

Bauhinia Vahlii, an enormous and perhaps the most gigantic of the climbing plants of the Indian forests. Its uses are almost more numerous than those of any other forest plant except the bamboo. The bark is made into strong cordage, which is used for suspension bridges, and the fibre has been employed as a material for paper-making. The large flat leaves are sewn together, and used as plates, cups, umbrellas, and rain-caps. The pods are roasted, and the seeds eaten.

Coco nut (*Cocos nucifera*). The valuable coir fibre of commerce is obtained from the fibrous pericarp. A fibre is also prepared from the leaf stalks, but compared to the coir it is unimportant. Coir is very largely used in the manufacture of mats and matting. The net of fibres at the base of the petioles is made into bags and paper, and is also used in Ceylon for straining toddy.

Udal (*Sterculia villosa*), a moderate sized tree, common in the forests throughout India and Burma. The tree is so highly valued for its fibre, that in the more accessible forests, it may be said to occur chiefly as a bush from its branches being constantly lopped for the fibre they contain. The fibre is coarse but strong, and is made into ropes and coarse bags, and in Bengal, Burma, and South India, into ropes and breastbands for dragging timber.

Opium.—A cake of Benares Abkári or Excise Opium was obtained for the Museum. It consists of opium produced in the Benares Agency, which is exposed to the sun in shallow wooden trays until it has gradually become inspissated to such a consistence that 100 grains when dried on the steam-table at 200° Fahrenheit yield 90 grains at least of solid matter. The opium at this consistence is mixed up and trampled into a homogeneous mass, which is cut into portions of 2 lb. 0·914 oz. weight, and moulded into cakes in a hand-press, and stamped with the device of an Imperial crown and the words "Benares Opium." The cakes are then wrapped in two folds of Nepal paper (prepared from bamboo), the inner paper being smeared with a few drops of poppy oil to prevent adhesion. This form of opium is consumed either as a decoction or as prepared into madak or chandu for smoking in an opium pipe.

Of **Sugars** a few samples were selected from the exhibit of Messrs. Carew and Co.

Among the **Fruits** that of the Apricot (*Prunus Armeniaca*) deserves special mention, as there seems no reason why it should not, in a dried state, become an article of export to this country. In the North of India it is generally cultivated, and is naturalised in Afghánistán, Kashmír, and Chumba, in which countries the fruit is largely eaten by all classes, either when fresh or dried. From the kernels an oil is expressed which is used for burning in lamps,) for culinary purposes, and for the hair. In Damascus the stones are removed from the fruits and the pulp rolled out into thin sheets, in which form it is sold as food in the bazaars.

Another important article of food of the aboriginal tribes is afforded in the fleshy flowers or corollas of the **Mahwa** or Mahuá Tree (*Bassia latifolia*), a large deciduous tree common in the forests of Central India, and cultivated and self-sown throughout India generally. It is described as the most generally useful tree of the regions where it occurs. Mahwa flowers are also used as food for cattle, and are considered to be very fattening, for which purpose they are now exported to Europe. A good spirit is also distilled from them, and they also afford sugar.

Of a large collection of dyes, tans, &c., specimens of the undermentioned were among the more important selected :—

Safflower (*Carthamus tinctorius*).—An herbaceous plant with large yellow flower-heads, cultivated as a dye crop all over India. The flowers afford both a red and a yellow dye. At one time the cultivation of safflower in Bengal was one of the most important industries, but the introduction of aniline dyes has almost entirely ruined the trade. The seed, known as Kurdee, is an important oil seed of India.

Bengal Kino Tree (*Butea frondosa*).—A deciduous tree well known in India from its handsome, bright, orange-red flowers, which appear before the leaves in the hot season. The dried flowers known as "pulas" or "tesu," give a yellow dye which is extracted by simply boiling in water. The gum from this tree is sold under the name of Bengal Kino, and has the same properties as that obtained from *Pterocarpus Marsupium*; it is said to be used to purify indigo. The tree possesses valuable medicinal properties.

Catechu, Cutch, or Káth (*Acacia Catechu*). A common tree in most parts of India and Burma, attaining a height of from 30 to 40 feet. It yields a valuable extract similar to Gambir (*Uncaria gambier*) obtained by boiling down chips of the heartwood; it is used largely for dyeing and tanning, by calico printers to produce metallic shades, and also as an astringent in medicine. The value of the catechu exported from India during 1884–85 and the preceding four years was as follows :—1880–81, Rs. 42,66,415; 1881–82, Rs. 25,30,840; 1882–83, Rs. 30,52,434; 1883–84, Rs. 35,32,000; 1884–85, Rs. 28,20,785. The bulk of these exports consisted of Burma or Pegu cutch, but Bombay and the north-west provinces also export a considerable amount, the cutch of the latter being more particularly interesting, since it is of a different nature; it is of a paler colour than Burma cutch, and is baked into large cubes resembling Gambir. Instead of being boiled down to a thick extract, and then cast into large masses, twigs are placed in the concentrated decoction and the Kath allowed to crystallize. The substance thus obtained is afterwards thrown into cubes about $1\frac{1}{2}$ inches in size.

The result of this mode of preparation is the production of a much purer article, and this or gambir is the form of catechuic acid eaten in pán by the natives of India.

From the foregoing notes it will be seen that from several of the British Colonies represented at the late Colonial and Indian Exhibition no specimens were obtained for the Kew Museum. This, in the case of South Australia, St. Helena, Ascension, Malta, Hong Kong, and the Falkland Islands, is due to the fact that none of the exhibits were required for the Museum.

With regard to Queensland and New Zealand the collections of woods from both Colonies were very perfect, especially those of Queensland. Many of them would have been very desirable additions to the Kew collections, the specimens already in our possession of woods from the former colony being very unsatisfactory representatives of its timber resources; but though frequent applications were made to the Executive Commissioners for both Colonies, the result in each case was unsuccessful.

J. R. J.